REMARKS/ARGUMENTS

Claims 1-26 were originally filed in the present application. In response to a Restriction Requirement made in the pending Office Action, Applicants previously elected to prosecute Group I, claims 16-26, in the present application, and has withdrawn Group II, claims 1-15, from consideration at this time; these claims have also been canceled from the present application. In the present Amendment, the Applicants amend claim 16 to clarify a point previously argued back and forth with the Examiner. Accordingly, claims 16-26 remain pending in the present Application, and the Applicants respectfully request reconsideration of these claims.

I. REJECTIONS UNDER 35 U.S.C. §102

The Examiner has again rejected claims 16-18 and 20-26 under 35 U.S.C. §102(b) as allegedly anticipated by U.S. Published Patent Application No. 2004/0036164 to Koike, *et al.* The Applicants respectfully disagree with the Examiner's allegation because Koike does not disclose each and every element of independent claim 16.

Specifically, Koike does not disclose a semiconductor package device having an IC chip comprising:

> a final thickness less than a thickness of the package substrate on which it is mounted, wherein the final thickness is selected so that the chip distorts substantially in accordance with distortion of the package substrate occurring during temperature changes such that a shape of the chip substantially conforms to a shape of the package substrate despite the mismatch in their respective coefficients of thermal expansion.

(Claim 16). While Koike may disclose that the IC chip may have a thickness less than a thickness of the package substrate, Koike does not disclose *selecting* that thickness so that the chip distorts in accordance with the package substrate during temperature changes so that the chip conforms to the same shape as the package substrate. The Examiner

continues to assert that Koike's IC chip "inherently distorts, at least to some small degree, with the substrate when temperature changes." In addition, the Examiner has cited paragraph [0074] of Koike for the proposition that because the IC chip and substrate are cured together (for the resin between them), the chip necessarily substantially conforms to the shape of package substrate. The Applicants respectfully disagree with this interpretation of Koike for several reasons, which are discussed in turn below.

A. Temperature changes during Koike's curing of the package does not disclose selecting a final thickness of the chip "so that the chip distorts substantially in accordance with dis*tortion of the package substrate occurring during operational temperature changes*."

First, while Koike does disclose the simultaneous *curing* of the IC chip and substrate (when curing the encapsulant) mentioned by the Examiner, this does not address the entire limitation in independent claim 16, namely, that "the final thickness is selected so that the chip distorts substantially in accordance with distortion of the package substrate *occurring during operational temperature changes* such that a shape of the chip substantially conforms to a shape of the package substrate." The Examiner continues to argue that if the shape of the chip would have not substantially conformed to the shape of the substrate during curing of the encapsulant, the chip would crack and become defective. Thus, the Examiner believes that the chip must conform to the shape of the substrate "at least to some small degree."

While these components may be cured together, Koike does not address later temperature changes typically experienced during operation of the package that can cause two components of different CTEs to distort differently. The present claims identify this issue, and take an affirmative step to cause them to distort in the same manner and to the same degree, and thus to conform to one another. That step is expressly selecting a final

thickness of the chip so that it distorts in accordance with the substrate such that the shape of the chip substantially conforms to the shape of the substrate. Koike simply does not disclose or suggest any such chip thickness selection so as to provide this solution. Baking to components together, and then assuming that an affirmative selection of chip thickness must have taken place because neither component cracked during curing is not even close to choosing a thickness that allows these components to survive various temperature changes experienced during operation.

B. Koike teaches grinding after package encapsulation, and thus is not done for selecting a final thickness of the chip "so that the chip distorts substantially in accordance with dis*tortion of the package substrate occurring during operational temperature changes*."

The primary purpose of Koike is to provide for a manufacturing process that wholly encapsulates the IC chip prior to any grinding so that the components do not move, and thus crack, when grinding it. Stated another way, chip thickness is done after encapsulation, yet it is the encapsulation that the Examiner cites as the proof that the substrate and chip thickness are "selected" so as to prevent cracking as recited in claim 16. Thus, it is only the encapsulation in Koike that prevents cracking, and not the final thickness of the IC chip that is "selected so that the chip distorts substantially in accordance with distortion of the package substrate occurring during temperature changes such that a shape of the chip substantially conforms to a shape of the package substrate," as recited in claim 16. Furthermore, Koike teaches fully encapsulating the IC chip onto the substrate before any grinding of the chip ever takes place. (Koike, para. [0076]). Moreover, any grinding done is *expressly done* in Koike to fit the package device within a certain dimension, and is therefore clearly and explicitly not done to select a final thickness of the IC chip "such that a shape of the chip substantially conforms to a shape

of the package substrate," as recited in claim 16.

Because Koike is clearly directed to grinding the *assembled* package to fit within a certain dimension, any number of material choices in Koike would result in IC chips of varying thicknesses, even though they are all formed using the same express grinding process. For example, if three different substrate materials were selected, perhaps based on customer choices, each of these substrate materials could have different thicknesses from each other. Thus, even if the packages assembled with these different substrates where *ground to the same overall thicknesses for only size/dimension purposes*, as taught in Koike, the thickness of the IC chips in each package would still differ from one another. Therefore, it cannot be said that a specific thickness for each IC chip is selected in Koike's process such that a shape of the chip substantially conforms to a shape of the package substrate during operational temperature changes. In stark contrast, the present claims compensate for this shortcoming by providing for the precise selection of the thickness of individual IC chips so that they distort with the specific substrate material and thickness being used to manufacture the device.

C. Conclusion

In sum, the Applicants respectfully assert that the mere chance that the chip may distort to some small degree with the package substrate does not equate to a disclosure that the final thickness of the chip is selected so that it distorts in accordance with the substrate such that the shape of the chip substantially conforms to the shape of the substrate, despite these two components having different coefficients of thermal expansion. Also, the whole encapsulation of the IC chip in Koike prior to grinding prevents chip cracking by holding the components together, and not a selected final thickness of the IC chip that allows the chip to contort with the substrate. Moreover, any

grinding done in Koike is to fit the package device within a certain dimension, and is not done to select a final thickness of an IC chip constructed of a certain material, as recited in claim 16. Accordingly, Koike does not disclose all of the elements of independent claim 16, as well as its dependent claims, and the Applicants respectfully request that the Examiner withdraw these rejections.

II. REJECTIONS UNDER 35 U.S.C. §103

The Examiner has also again rejected claims 16-18 and 20-26 under 35 U.S.C. §103(a) as allegedly obvious over Koike. The Applicants continue to respectfully disagree with this assertion because Koike also does not teach or suggest all of the element of independent claim 16, as herein amended. As discussed above, Koike does not teach a semiconductor package device having an IC chip comprising "a final thickness less than a thickness of the package substrate, wherein the final thickness is selected so that the chip distorts substantially in accordance with distortion of the package substrate occurring during operational temperature changes such that a shape of the chip substantially conforms to a shape of the package substrate despite the mismatch in their respective coefficients of thermal expansion." Accordingly, for the reasons discussed above, the Applicants respectfully assert that independent claim 16, as herein amended, is not obvious in view of Koike. For at least these reasons, the Applicants respectively request that these rejections also be withdrawn.

Finally, the Examiner has again rejected dependent claim 19 under 35 U.S.C. §103(a) as allegedly obvious over Koike in view of U.S. Patent No. 6,559,525 to Huang. As discussed above, Koike does not teach or suggest all of the elements of amended independent claim 16, from which claim 19 depends. Specifically, encapsulating a package to hold the chip and substrate together is not even close to the same thing as

selecting the thickness of the chip so that it contorts with a package having a different CTE. Much less is grinding an encapsulated package even close to the same thing as grinding the thickness of the chip, prior to encapsulation, so that the thickness of the chip allows it to contort with the package having a different CTE. Moreover, Huang does not provide this missing element, and is only relied upon for showing the use of a heat spreader on the IC chip. Thus, the Applicants also respectfully request that the Examiner withdraw this rejection as well.

III. CONCLUSION

The Applicants respectfully submit that pending claims 16-26 are in condition for allowance, and request a Notice of Allowability for the pending claims. The Examiner is invited to contact the undersigned Attorney of Record if such would expedite the prosecution of the present Application. Although no fees are believed to be due with this filing, if any fees are determined to be due, the Applicants hereby authorize the Director to charge the necessary amount, or credit any overpayment, to Deposit Account No. 13-0480, referencing the Attorney Docket Number specified herein

Respectfully submitted,

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